

### **REMARKS/ARGUMENTS**

Reconsideration of this application is requested. Claims 1-37 are active in the application subsequent to entry of this Amendment.

The claims have been amended in order to more particularly point out and distinctly claim that which applicants regard as their invention.

Claim 1 is amended in order to further characterize the content of the metallic compound as it continuously changes in the depth direction from the surface of the material such that the content of the metallic compound is greater than the content of the organic polymer at the surface of the material.

In item 2 of the Official Action the examiner objects to claims 24 and 36 because "these claims do not appear to add any limitations to the claims from which they depend". These claims originally used the expression "hard coating layer." The term "hard" was deleted in the Amendment of January 29, 2003. In the above amendments, both claims are revised to refer to a "scratch-resistant coating layer" consistent with the description found on pages 28-29 and specifically the description of a "hard coating film having an excellent surface hardness and having excellent scratch resistance and anti-wearing properties" as given on page 28, lines 17-19. Examples listed include automobile window glass, building glass, protection for CRT displays, flat panel displays, etc. Thus claims 24 and 36 are believed to further define and limit the claims from which they depend. Reconsideration is requested.

In the Official Action there are two prior art-based rejections advanced (see items 3-5 of the Action) and two prior art documents are cited. In contrast to the references cited in the Action (and discussed below), the organic-inorganic composite graded material of the present invention is characterized by two important features: feature (A) that an organic polymer compound and a metallic compound are chemically bonded to each other, and feature (B) that the content of the metallic compound continuously changes in the depth direction from the surface of the material and that, in the surface of

the material, the content of the metallic compound is greater than the content of the organic polymer compound.

The above-underlined characteristic is added to claim 1. Basis for this in the original description will be apparent in the following discussion. Applicants address these rejections as follows:

**Liepins (US 4,390,567)**

In the Official Action, page 2, paragraph 4, the Examiner cites Liepins and rejects claims 1, 5, 11, 17, 19 to 30, 32, 33 and 35 to 37 as being anticipated by Liepins (35 USC §102(b)).

There is no anticipation based on this reference as Liepins differs from the present invention in that Liepins fails to satisfy the above requirement (A), that is, an organic polymer compound and a metallic compound in the invention of Liepins have no chemical bond to each other.

This will be apparent from an analysis on the basis of Example 1 of Liepins. Example 1 describes to the following: glass microballoons mounted on glass stalks are coated with 28  $\mu\text{m}$  of polycyclooctarene, then the glass stalks are dipped in a gold resinate solution, and the coated microballoons are dried. In this case, the gold penetrates the coating to a depth of 5 – 6  $\mu\text{m}$ .

In Example 1 of Liepins, the polycyclooctarene corresponds to the organic polymer compound in the present invention, and the gold resinate corresponds to the metallic compound in the present invention. In the above reaction, it is applicants' understanding that the polycyclooctarene and a metal resinate are not chemically bonded to each other, and that gold merely penetrates the polycyclooctarene layer.

Every element of a challenged claim must be disclosed within this single reference. *PPG Industries Inc. v. Guardian Industries Corp.*, 37 USPQ2d 1618, 1624 (Fed. Cir. 1996). Absence from the reference of any claimed element negates anticipation *Kloster Speedsteel AB v. Crucible Inc.* 23 USPQ 160 (Fed. Cir. 1986).

Therefore, since the invention of Liepins does not satisfy requirement (A) of the present invention, anticipation has not been established. The rejection based upon Liepins should be withdrawn.

**JP-A-11-221880**

In the outstanding Official Action, page 4, paragraph 5, the Examiner cites JP-A-11-221880 and argues that claims 1 to 3, 5, 6, 8 to 29 and 32 are anticipated by JP-A-11-221880 (35 USC §102(a)). In contrast to the description of JP-A-11-221880, the present invention has the above feature (B), while the invention of JP-A-11-221880 does not have this feature.

In the present invention, "the content of the metallic compound continuously changes in the depth direction from the surface of the material and the content of the metallic compound in the surface of the material is greater than the content of the organic polymer compound in the surface." This means in the material surface, the content of the metal atoms is larger than the content of carbon atoms, and the ratio of the content of metal atoms to the content of carbon atoms continuously decreases in the thickness direction from the material surface.

The coated surface of an organic-inorganic composite graded material obtained in Example 1 of the present invention was sputtered to scrape layers off, and carbon atoms and silicon atoms in the surface of the material were measured for their contents at various time intervals (see the discussion on page 34, lines 11-18 of the present specification) .

Fig. 1 of the specification shows the results. As shown in Fig. 1, the film surface has a silicon content of nearly 100 % before the sputtering, and as the sputtering proceeded to scrape layers off, the content of silicon atoms in the film surface decreases. After a sputtering time period of about 30 minutes, the film surface comes to have a carbon atom content of 100 %.

The graded material obtained in Example 1 of the present invention is designed to have a continuous change in the content of the metallic compound toward the depth from the material surface, so that the material surface has a higher silicon atom content than a carbon atom content and that a surface opposite to the material surface has a lower silicon atom content than a carbon atom content. Figs. 2 to 6, 15, 18, 24 to 30, 32 and 33 show results of measurements of sputtered organic-inorganic composite graded materials obtained in Examples 2 to 7, 10, 14 to 19, 21, 24 and 25. These results are similar to the result in Example 1.

By contrast, in a composite film obtained by the method described in JP-A-11-221880, the material surface has a lower metal atom content than a carbon atom content, and the content of metal atoms is constantly lower than the content of carbon atoms in the entire thickness direction from the material surface to a surface opposite to the material surface.

This is explained and illustrated in Table 3 of JP-A-11-221880 which shows contents of metal atoms (silicon atoms) in the surfaces of composite materials obtained Examples 1 and 9. In Example 1, the values of the metal atom contents are only 9.42 % (surface), 8.02 % (0.2  $\mu\text{m}$  deep), 7.58 % (0.4  $\mu\text{m}$  deep), 7.86 % (0.6  $\mu\text{m}$  deep) and 7.87 % (0.8  $\mu\text{m}$  deep). In Example 9, the values of the contents are only 7.59 % (surface), 6.12 % (0.2  $\mu\text{m}$  deep), 5.81 % (0.4  $\mu\text{m}$  deep), 6.03 % (0.6  $\mu\text{m}$  deep) and 6.02 % (0.8  $\mu\text{m}$  deep).

The organic-inorganic composite graded material of the present invention has a surface has a higher metallic compound content than an organic polymer compound content, so that it can serve, as an intermediate film, to improve the adhesion, for example, between an organic material and an inorganic or metallic material layer. However, the film described in JP-A-11-221880 cannot accomplish the above effect of the organic-inorganic composite graded material of the present invention.

WATANABE et a;  
Appl. No. 09/807,904  
August 6, 2003

Therefore, the invention of JP-A-11-221880 fails to satisfy the requirement (B) of the present invention, and thus the rejection based upon this reference should be withdrawn.

While applicants appreciate the examiner's indication that claims 4, 7, 31 and 34 would be allowable if rewritten in independent format, they respectfully submit that all the claims in this application are in condition for allowance for the reasons explained in detail above. Reconsideration, favorable action and allowance are solicited. Should the examiner require further information, please contact the undersigned by telephone.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

By: \_\_\_\_\_



Arthur R. Crawford  
Reg. No. 25,327

ARC:eaw  
1100 North Glebe Road, 8th Floor  
Arlington, VA 22201-4714  
Telephone: (703) 816-4000  
Facsimile: (703) 816-4100